

## **Motor skills matter to physical activity – at least for children**

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### **Abstract:**

Physical activity (PA) is an effective means of curbing the prevalence of child obesity, and fundamental skills are hypothesized to be an important factor that determines physically active or inactive behavior in children.<sup>1</sup> Research evidence suggests that adolescents and young adults with proficient motor skills in sport-related activities are more likely to have a physically active lifestyle.<sup>1</sup> Because physically active lifestyles start at a young age and track into adulthood,<sup>2</sup> the question arises: how young should we start to teach motor skills to children to foster physically active behavior? Built on previous research work, the study by Robinson et al.<sup>3</sup> investigated the predictive power of motor skill competence and perceived physical competence for school day PA in pre-school children.

**Keywords:** physical activity | motor skills | children

### **Article:**

**\*\*\*Note: Full text of article below**



Research Highlight

# Motor skills matter to physical activity — At least for children

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Physical activity (PA) is an effective means of curbing the prevalence of child obesity, and fundamental skills are hypothesized to be an important factor that determines physically active or inactive behavior in children.<sup>1</sup> Research evidence suggests that adolescents and young adults with proficient motor skills in sport-related activities are more likely to have a physically active lifestyle.<sup>1</sup> Because physically active lifestyles start at a young age and track into adulthood,<sup>2</sup> the question arises: how young should we start to teach motor skills to children to foster physically active behavior? Built on previous research work, the study by Robinson et al.<sup>3</sup> investigated the predictive power of motor skill competence and perceived physical competence for school day PA in preschool children.

This study was based on motor development theories which postulate that an active behavior depends on the maturity of the skills that support the behavior in the environment in which the behavior takes place.<sup>4</sup> The purpose of the study was to determine “the relationship of motor skill competence and perceived physical competence, along with sex and BMI, to school-day physical activity...”. This research purpose was supported by a strong rationale, which was based on an extensive review of related literature and the researchers’ interpretive reasoning of the link between motor skill development and PA behavior.

The study is descriptive in nature, using a correlational design. The data were collected from 34 young children (22 girls and 12 boys) with an average age of 4.75 years. The research site was a preschool servicing the children from 7:00 am to 6:00 pm Monday through Friday. The curriculum

included works in arts, crafts, reading, writing, arithmetic, and gross-motor movement based physical activities. The gross-motor movement opportunities were two 30-min long unstructured and unplanned recess with no formal instructions. The recess took place on a playground equipped with swings, balance beams, slides, and climbing ladders. It is clear that the recess was not an instructional opportunity of physical education for the children.

The variables included demographic information, age, sex, height and weight converted into the body mass index (BMI). PA was measured using pedometers, in average steps per minute in three school days. Motor skill competence was measured using Ulrich’s Test of Gross Motor Development.<sup>5</sup> The test assesses competence in both locomotor movement and object control/manipulation skills. The locomotor assessment consists of six skills: running, leaping, horizontal jumping, sliding, galloping, and hopping; whereas the object control assessment includes skills of throwing, kicking, catching, striking, dribbling, and rolling. The skills were evaluated on either a 3-level or 5-level rubric criterion scale validated by Ulrich.<sup>5</sup> Perceived physical competence was measured using Harter’s Pictorial Scale of Perceived Competence and Social Acceptance for preschool children validated by Harter and Pike.<sup>6</sup> Pictures of skillful or unskillful children performing a physical task with differential scales are used to ask the child being assessed to indicate whether he/she is similar to either skilled or unskilled performer. Robinson et al.<sup>3</sup> presented validity and reliability information about these measures for readers to evaluate the quality of the data used in the study.

The data collection followed a well-thought-out sequence: demographic information was collected first, followed by pedometer data over several days. After that, the Pictorial Scale of Perceived Competence and Social Acceptance was administered to the children individually. Lastly, the motor skills tests were administered individually to collect data on motor skill competence. This sequence prevented interactive contamination that might take place in a study measuring

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multiple variables. Particularly in this study, measuring motor skill competence after measuring perceived physical competence prevented possible inflation of the response scores in perceived physical competence; which might result from using the opposite sequence: measuring skills before measuring the perception.

A simple but straightforward analytical strategy was employed to answer the research question: correlation analysis followed by a multiple regression with PA as the outcome measure and sex, BMI, perceived physical competence, locomotor skill and object control skill as the predictors. The reported cumulative variances showed that locomotor skill was the only meaningful predictor ( $R^2 = 0.213$ ,  $p = 0.007$ ) for the children's daily PA. Other predictors were not included in the regression equation as meaningful predictors.

The researchers interpreted the finding by comparing the results with those found in epidemiology studies. They found that this group of children was relatively inactive. They also found that this group of children, as a whole, was overweight and obese with BMI values ranging from 85th to 90th percentile on the U.S. Center for Disease Control and Prevention's child growth chart. Although the BMI did not enter into the regression equation, the researchers suspected that it played a role in the low daily PA of this group of children. Although this reasoning is plausible, given the purpose of the study, I feel that calorie-based measures (such as total activity calorie counts) would be a better index to capture the activity pattern for this group of children, because it would take into account the impact of body size in calculating PA.

This study answered the question that it set out to answer. The finding was clear about the role of physical skills, especially fundamental locomotor skills, in the preschool children's daily PA. In interpreting the results, the researchers expressed dissatisfaction about the low variance (21%) of PA accounted for by the locomotor skills. However, I would argue that the amount of variance was significant, both statistically and substantively. The finding supports the distinction between types of skills and the purpose of performing the skills. As reported, the correlation between locomotor skill and object control skill is very high ( $r = 0.86$ ). Nevertheless, the PA was measured primarily on activities that accrued in movements involving only locomotor skills. Most often, young children execute object controlling movement for purposes different from those for which they execute locomotor skills. But these movements do cost energy (calories). I doubt that pedometers would be able to record the many object-induced movements involving only limb movements, such as throwing a ball. This

loss in the amount of recorded PA should be examined in future studies using calorie-based activity measures to determine its significance to health.

The role of perceived physical competence did not seem to be treated effectively in the Discussion; which may be because this variable did not enter into the regression equation. But the correlation between perceived physical competence and locomotor skill is moderate ( $r = 0.465$ ,  $p < 0.05$ ). In addition, there is a strong body of literature suggesting a possibility that perceived competence plays a more important role than actual competence in behavior development. I believe these two facts warrant the use of a hierarchical regression algorithm to independently determine the predictive power of motor skill competence and perceived physical competence. In so doing, I believe that the researchers might be able to better inform the reader whether perceived physical competence should be a measure in studies on skill-activity in young children.

In summary, the study contributed to our knowledge on the relationship between motor skills and PA behavior in children. In particular, the finding has not only confirmed this relationship, but also warned us that the relationship can evolve in children as young as 4 years old. The findings reiterate the importance of teaching children movement skills at a young age. Although a skill-activity causal direction cannot be inferred from this correlational study, the findings do provide meaningful preliminary information on which experimental studies can be designed to further clarify the role of physical skill proficiency in developing and sustaining a physically active lifestyle in children.

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